

299-W10-72 (A7162) Log Data Report

Borehole Information:

Borehole: 299-W10-72 (A7162)		Site: 216-T-7 Tile Field			
Coordinates (WA St Plane)		GWL¹ (ft): None		GWL Date: 05/10/05	
North	East	Drill Date	Elevation (TOC)	Total Depth (ft)	Type
136649.769	566676.597	08/47	675.62 ft	150	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	0.3	8 5/8	8	5/16	0.3	150

Borehole Notes:

A steel tape and caliper were used for casing measurements, and were rounded to the nearest 1/16 inch. Log data are referenced to the top of casing (TOC). Standing water existed in the borehole at 131.4 ft, which is well above the groundwater level in the area.

Spectral Gamma Logging System (SGLS) Equipment Information:

Logging System:	Gamma 1E	Type:	SGLS (70%) SN: 34TP40587A
Effective Calibration Date:	03/04/05	Calibration Reference:	DOE/EM-GJ864-2005
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

High Rate Logging System (HRLS) Equipment Information:

Logging System:	Gamma 1C	Type:	SN: 39-A314
Effective Calibration Date:	04/06/05	Calibration Reference:	DOE/EM-GJ865-2005
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Neutron Moisture Logging System (NMLS) Equipment Information:

Logging System:	Gamma 4H	Type:	SN: H310700352
Effective Calibration Date:	03/24/05	Calibration Reference:	DOE/EM-GJ855-2005
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Passive Neutron Logging System (PNLS) Equipment Information:

Logging System:	Gamma 4I	Type:	SN: U1754
Effective Calibration Date:	N/A	Calibration Reference:	N/A
	Logging Procedure: MAC-HGLP 1.6.5, Rev. 0		

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3	4	5
Date	05/10/05	05/10/05	05/10/05	05/10/05	05/10/05
Logging Engineer	Spatz	Spatz	Spatz	Spatz	Spatz
Start Depth (ft)	130.0	127.0	107.0	104.0	84.0
Finish Depth (ft)	126.0	106.0	103.0	83.0	69.0
Count Time (sec)	100	20	100	20	100
Live/Real	R	R	R	R	R
Shield (Y/N)	N	N	N	N	N
MSA Interval (ft)	1.0	1.0	1.0	1.0	1.0
ft/min	N/A ²	N/A	N/A	N/A	N/A
Pre-Verification	AE060CAB	AE060CAB	AE060CAB	AE060CAB	AE060CAB
Start File	AE060000	AE060005	AE060027	AE060032	AE060054
Finish File	AE060004	AE060026	AE060031	AE060053	AE060069
Post-Verification	AE060CAA	AE060CAA	AE060CAA	AE060CAA	AE060CAA
Depth Return Error (in.)	N/A	N/A	N/A	N/A	N/A
Comments	No fine-gain adjustment	No fine-gain adjustment. High rate interval: Dead time > 40 %	No fine-gain adjustment	No fine-gain adjustment. High rate interval: Dead time > 40 %	No fine-gain adjustment

Log Run	6	7	8 Repeat		
Date	05/10/05	05/10/05	05/10/05		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	70.0	50.0	26.0		
Finish Depth (ft)	49.0	1.0	13.0		
Count Time (sec)	20	100	100		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		
MSA Interval (ft)	1.0	1.0	1.0		
ft/min	N/A	N/A	N/A		
Pre-Verification	AE060CAB	AE060CAB	AE060CAB		
Start File	AE060070	AE060092	AE060142		
Finish File	AE060091	AE060141	AE060155		
Post-Verification	AE060CAA	AE060CAA	AE060CAA		
Depth Return Error (in.)	N/A	N/A	0		
Comments	No fine-gain adjustment. High rate interval: Dead time > 40 %	No fine-gain adjustment	No fine-gain adjustment		

High Rate Logging System (HRLS) Log Run Information:

Log Run	9	10	11	12	13
Date	05/11/05	05/11/05	05/11/05	05/11/05	05/11/05
Logging Engineer	Spatz	Spatz	Spatz	Spatz	Spatz
Start Depth (ft)	127.0	126.0	109.0	104.0	88.0

Log Run	9	10	11	12	13
Finish Depth (ft)	126.0	108.0	108.0	87.0	84.0
Count Time (sec)	300	100	300	300	100
Live/Real	R	R	R	R	R
Shield (Y/N)	N	N	N	N	N
MSA Interval (ft)	1.0	1.0	1.0	1.0	1.0
ft/min	N/A	N/A	N/A	N/A	N/A
Pre-Verification	AC132CAB	AC132CAB	AC132CAB	AC132CAB	AC132CAB
Start File	AC132000	AC132002	AC132021	AC132023	AC132041
Finish File	AC132001	AC132020	AC132022	AC132040	AC132045
Post-Verification	AC132CAA	AC132CAA	AC132CAA	AC132CAA	AC132CAA
Depth Return Error (in.)	N/A	N/A	N/A	N/A	N/A
Comments	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment

Log Run	14	15	16	17	18 Repeat
Date	05/11/05	05/11/05	05/11/05	05/11/05	05/11/05
Logging Engineer	Spatz	Spatz	Spatz	Spatz	Spatz
Start Depth (ft)	85.0	70.0	69.0	51.0	60.0
Finish Depth (ft)	84.0	69.0	50.0	50.0	52.0
Count Time (sec)	300	300	100	300	100
Live/Real	R	R	R	R	R
Shield (Y/N)	N	N	N	N	N
MSA Interval (ft)	1.0	1.0	1.0	1.0	1.0
ft/min	N/A	N/A	N/A	N/A	N/A
Pre-Verification	AC132CAB	AC132CAB	AC132CAB	AC132CAB	AC132CAB
Start File	AC132046	AC132048	AC132050	AC132070	AC132072
Finish File	AC132047	AC132049	AC132069	AC132071	AC132080
Post-Verification	AC132CAA	AC132CAA	AC132CAA	AC132CAA	AC132CAA
Depth Return Error (in.)	N/A	N/A	N/A	N/A	- 1
Comments	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment

Passive Neutron Logging System (PNLS) Log Run Information:

Log Run	19	20	21 Repeat		
Date	05/13/05	05/13/05	05/13/05		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	130.0	66.0	64.0		
Finish Depth (ft)	65.0	0.25	49.0		
Count Time (sec)	N/A	N/A	N/A		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		
Sample Interval (ft)	0.25	0.25	0.25		
ft/min	1.0	1.0	1.0		
Pre-Verification	DI112CAB	DI112CAB	DI112CAB		
Start File	DI112000	DI112261	DI112525		
Finish File	DI112260	DI112524	DI112585		
Post-Verification	DI112CAA	DI112CAA	DI112CAA		
Depth Return Error (in.)	N/A	- 1	0		
Comments	None	None	None		

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	22	23 Repeat			
Date	05/17/05	05/17/05			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	130.0	73.0			
Finish Depth (ft)	60.0	0.25			
Count Time (sec)	N/A	N/A			
Live/Real	R	R			
Shield (Y/N)	N	N			
Sample Interval (ft)	0.25	0.25			
Log speed (ft/min)	1.0	1.0			
Pre-Verification	DH012CAB	DH012CAB			
Start File	DH012000	DH012280			
Finish File	DH012279	DH012570			
Post-Verification	DH012CAA	DH012CAA			
Depth Return Error (in.)	N/A	- 1			
Comments	None	None			

Logging Operation Notes:

Logging was performed in this borehole during May 2005 with the SGLS, HRLS, PMLS, and NMLS. Logging was conducted with a centralizer on each sonde. Measurements are referenced to the top of casing. Repeat sections were collected in this borehole to evaluate the logging system's performance.

Analysis Notes:

Analyst:	Henwood	Date:	06/06/05	Reference:	GJO-HGLP 1.6.3, Rev. 0
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Pre-run and post-run verifications for the logging systems were performed before and after data acquisition. Acceptance criteria were met for all systems.

A casing correction for 5/16-in.-thick casing (8-in. casing) was applied to the spectral log data (SGLS and HRLS). The NMLS data were corrected for an 8-in. inside-diameter borehole.

SGLS, HRLS, and NMLS data were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated with EXCEL worksheet templates identified as G1EMar05.xls, G1Capr05.xls, and G4Hapr05.xls for the SGLS, HRLS, and NMLS using efficiency functions and corrections for casing, water, and dead time as determined from annual calibrations. Where SGLS dead time exceeds 40 percent, HRLS data are substituted. Correction for water was not needed in this borehole.

Log Plot Notes:

Separate log plots are provided for the man-made radionuclide (^{137}Cs) detected in the borehole, naturally occurring radionuclides (^{40}K , ^{238}U , ^{232}Th [KUT]), a combination of man-made, KUT, total gamma, and moisture, total gamma plotted with dead time, and moisture plotted with passive neutron and total gamma. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, casing corrections, or water corrections. Repeat log sections are also included where appropriate.

Results and Interpretations:

¹³⁷Cs was detected in this borehole at 36 and 37 ft and from 47 to 130 ft (total depth of the borehole). The maximum concentration was measured at approximately 40,000 pCi/g at 54 and 86 ft in depth. It appears there may be two distinct zones of contamination from approximately 50 to 71 ft and from 83 to 130 ft. Even though the depth interval from 71 to 83 ft suggests contamination, the detector may be receiving scattered gamma rays originating from the intense zones of gamma activity residing above and below the relative position of the detector. Therefore, it is possible the lower zone of contamination is separate from the higher zone. This separation may suggest that the lower zone represents lateral movement from another source.

The NMLS shows a maximum of approximately 25 percent volumetric moisture at 51 ft.

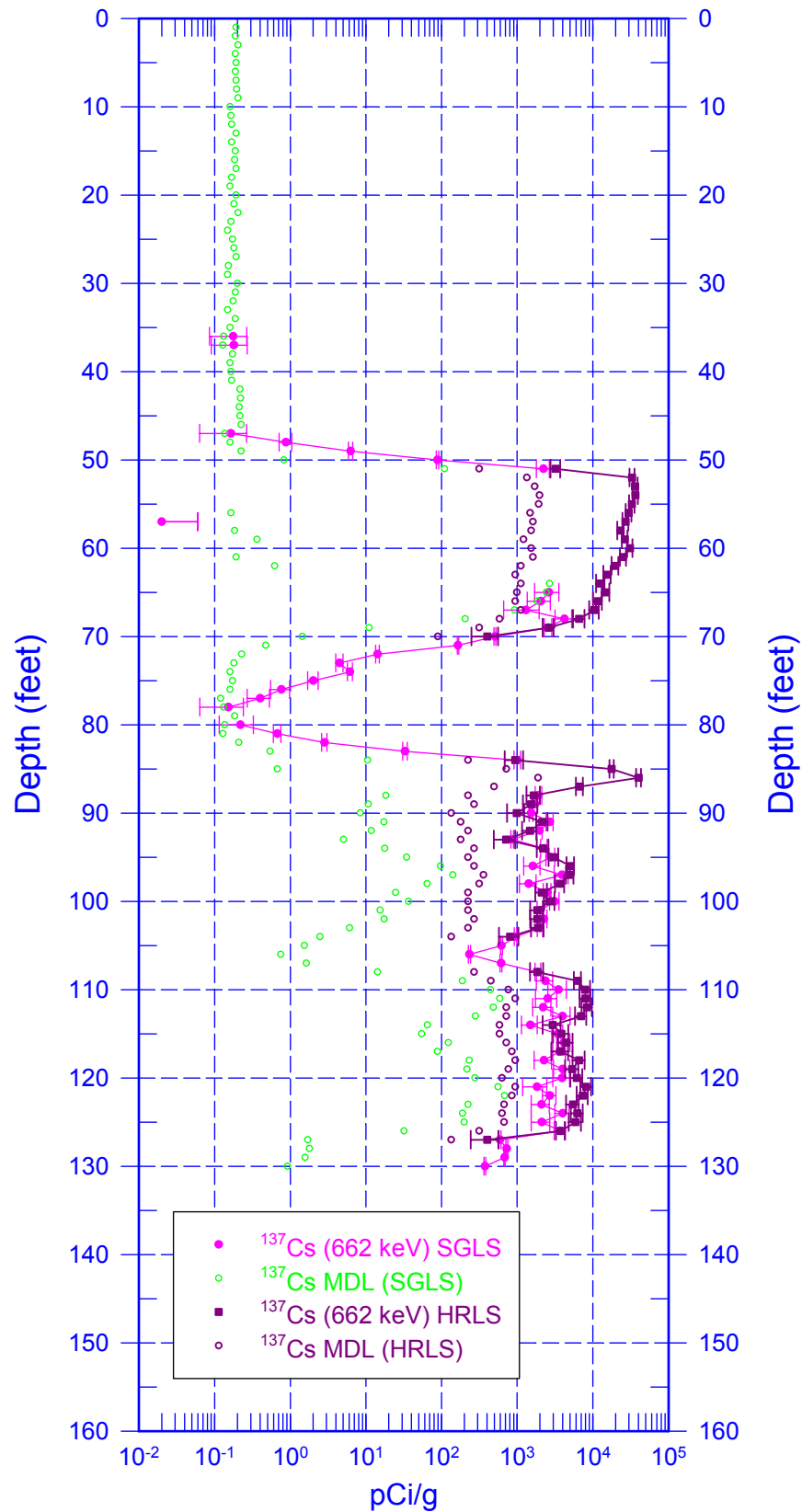
Passive neutron logging was performed in the borehole. This logging method has been shown to be effective in qualitatively detecting zones of alpha-emitting contaminants from secondary neutron flux generated by the (α ,n) reaction and may indicate the presence of transuranic radionuclides. Many transuranic radionuclides decay predominantly by alpha particle emission, and the passive neutron system may be useful to identify the existence of these radionuclides where no gamma emissions are available for detection. There is no calibration for this logging system, and the data provided are to be used qualitatively. PNLS measurements in this borehole appear to be affected by the high gamma activity zones where the total gamma is in excess of approximately 30,000 counts per second or a ¹³⁷Cs equivalent of approximately 1,000 pCi/g. It does not appear to be a true indication of alpha-emitting radionuclides in this borehole.

The repeat sections for the SGLS, HRLS, NMLS, and PNLS indicate good agreement.

¹ GWL – groundwater level

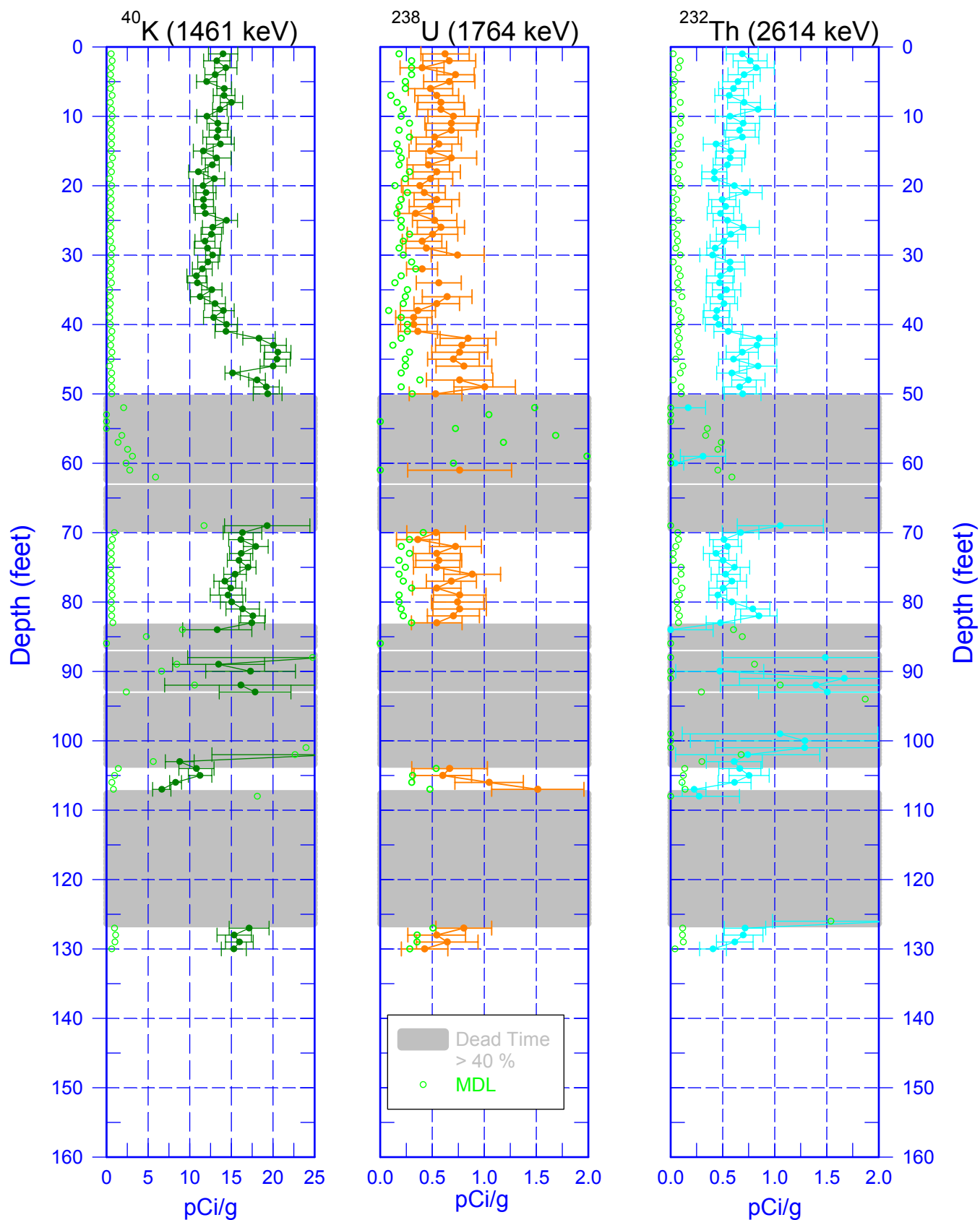
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Man-Made Radionuclides



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Natural Gamma Logs

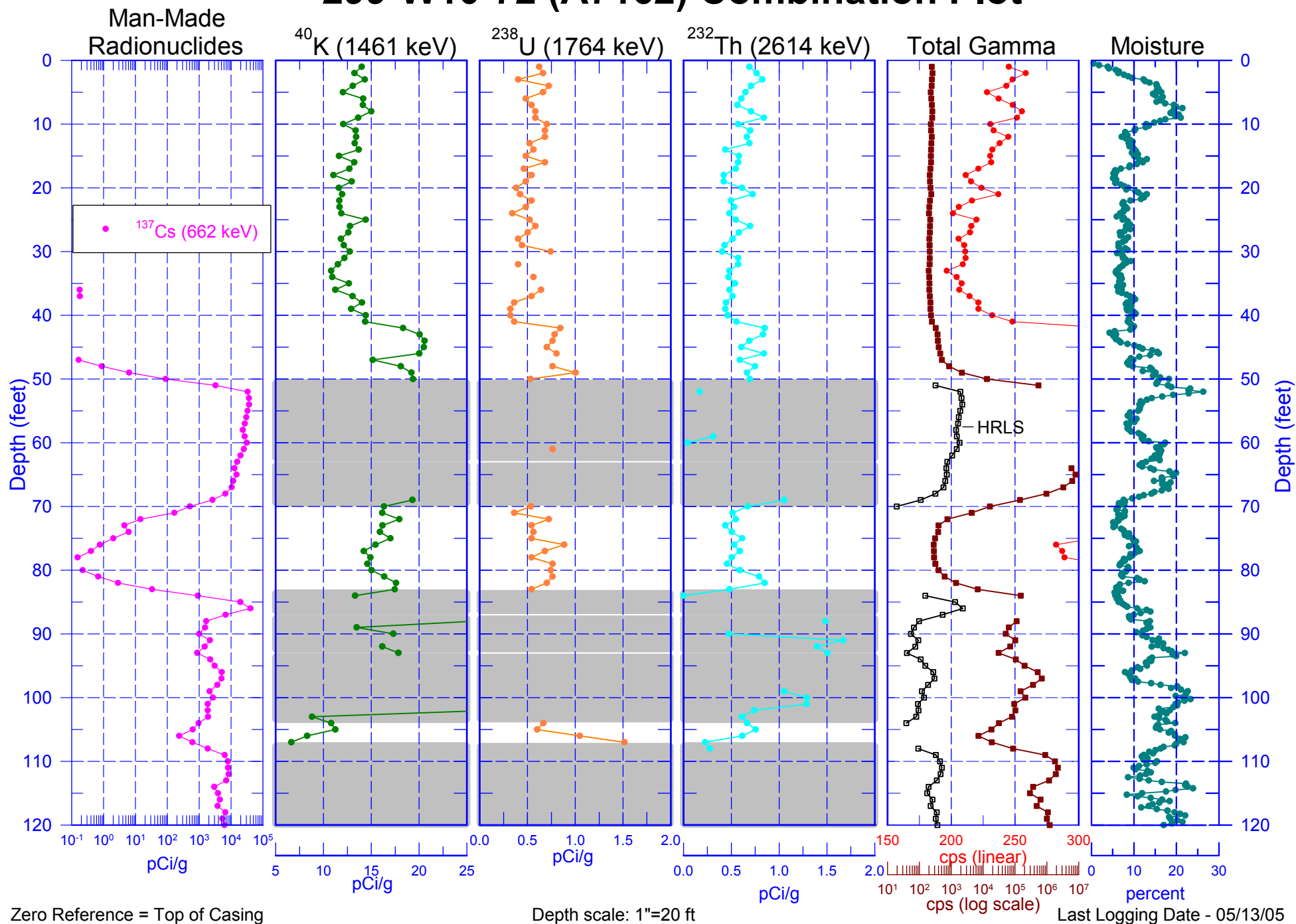


Zero Reference = Top of Casing

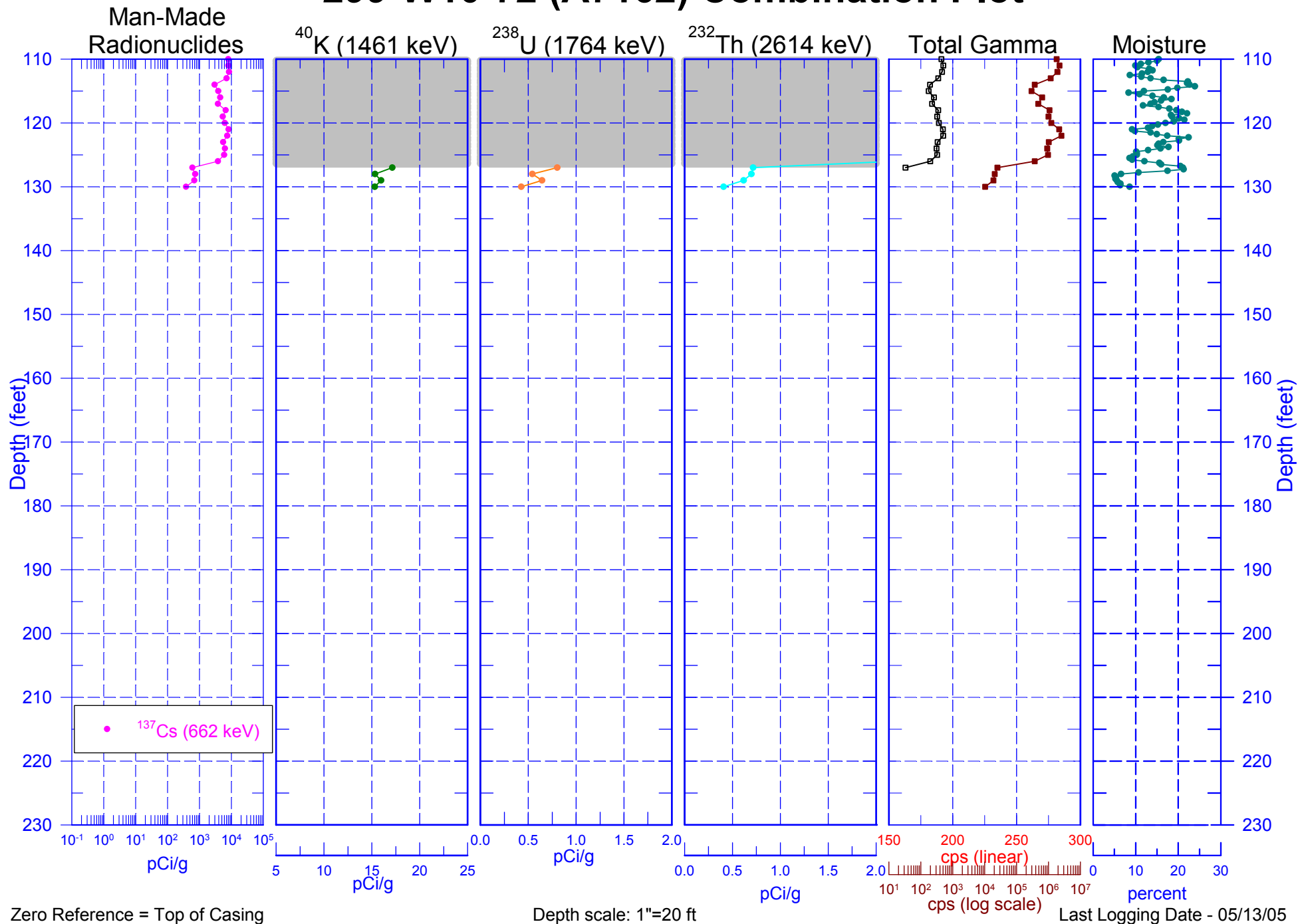
Depth Scale: 1" = 20 ft

Last Log Date - 05/13/05

299-W10-72 (A7162) Combination Plot

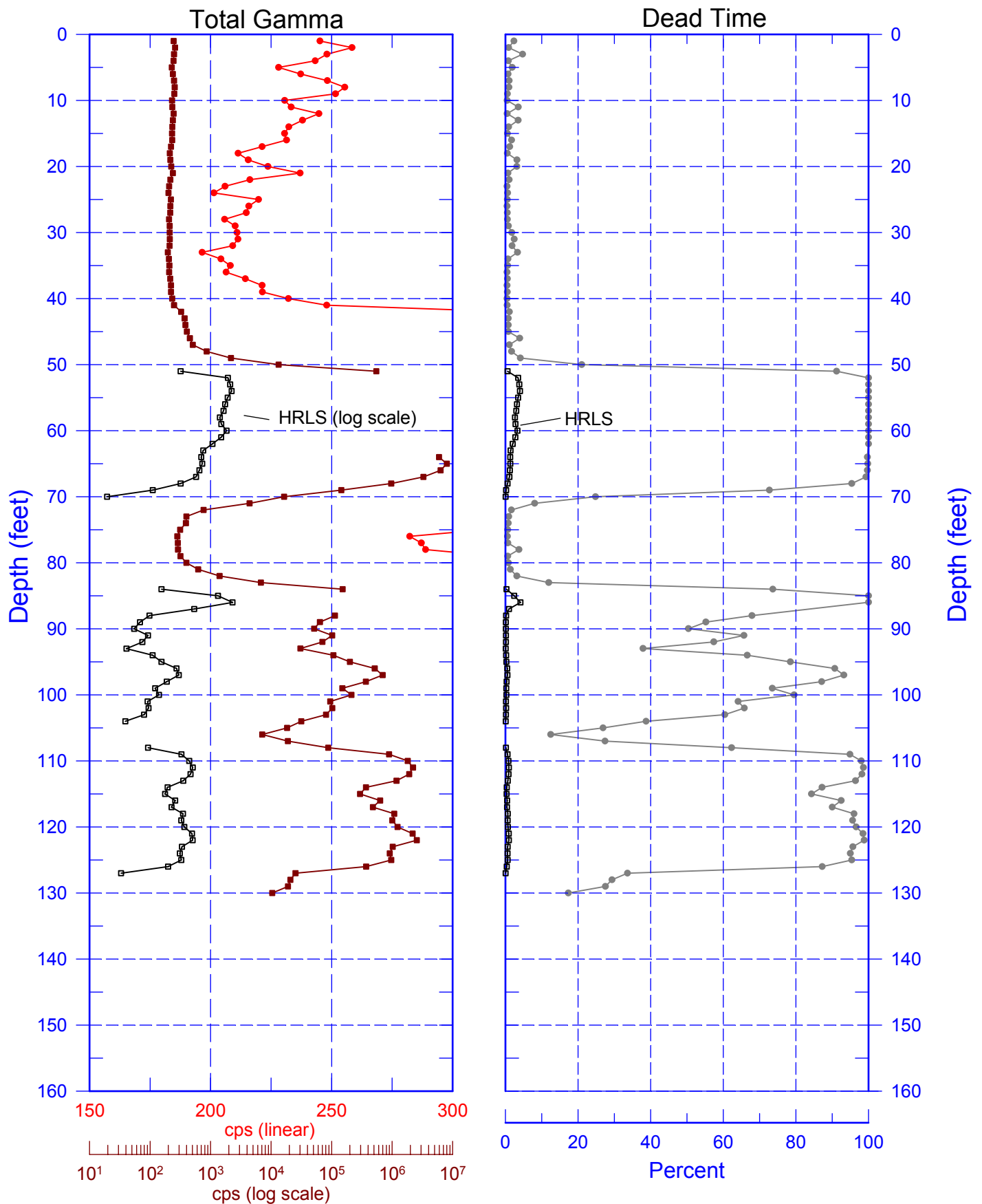


299-W10-72 (A7162) Combination Plot



299-W10-72 (A7162)

Total Gamma & Dead Time



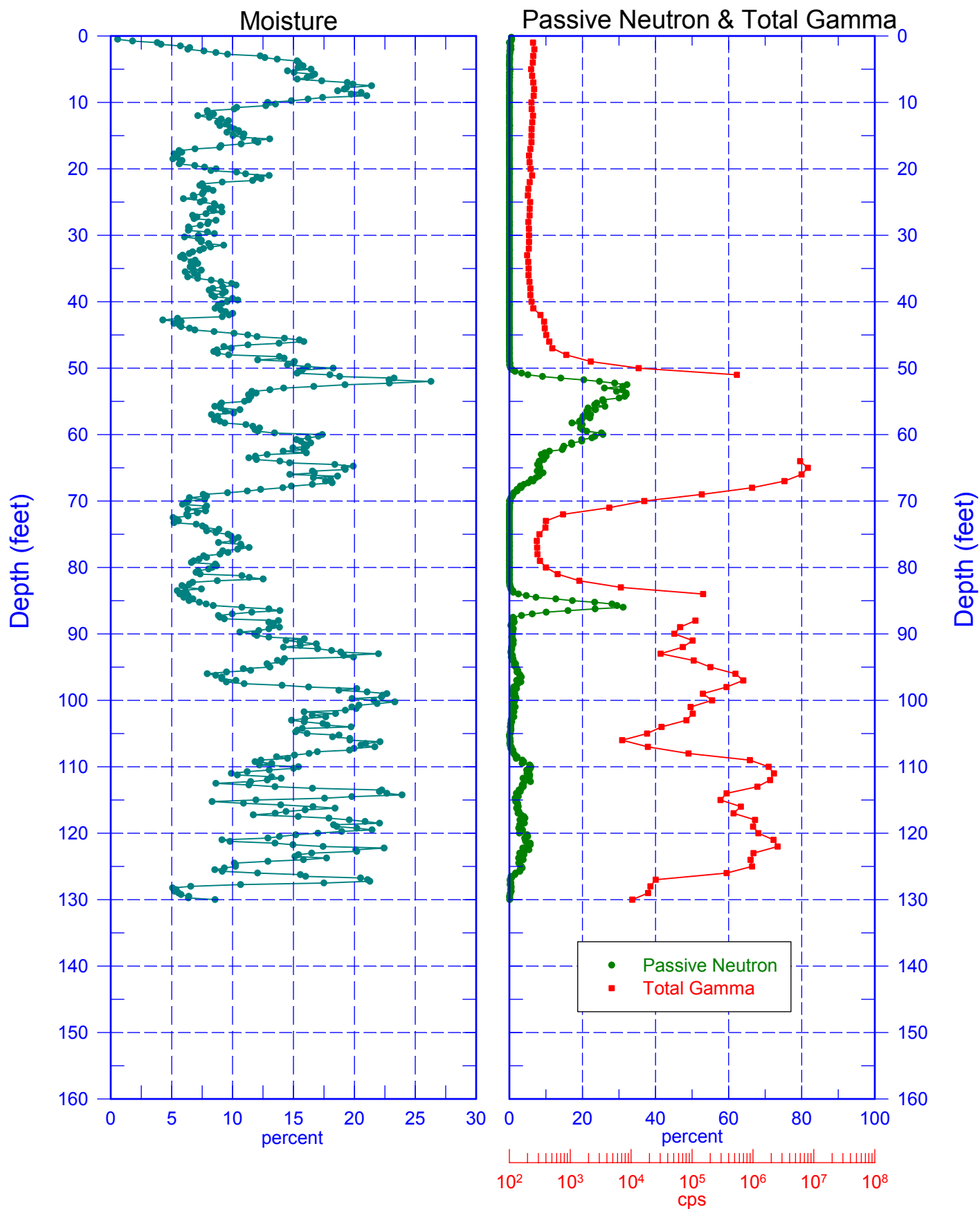
Depth scale: 1"=20 ft

Reference - Top of Casing

Last Log Date - 05/13/05

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Moisture, Passive Neutron, & Total Gamma



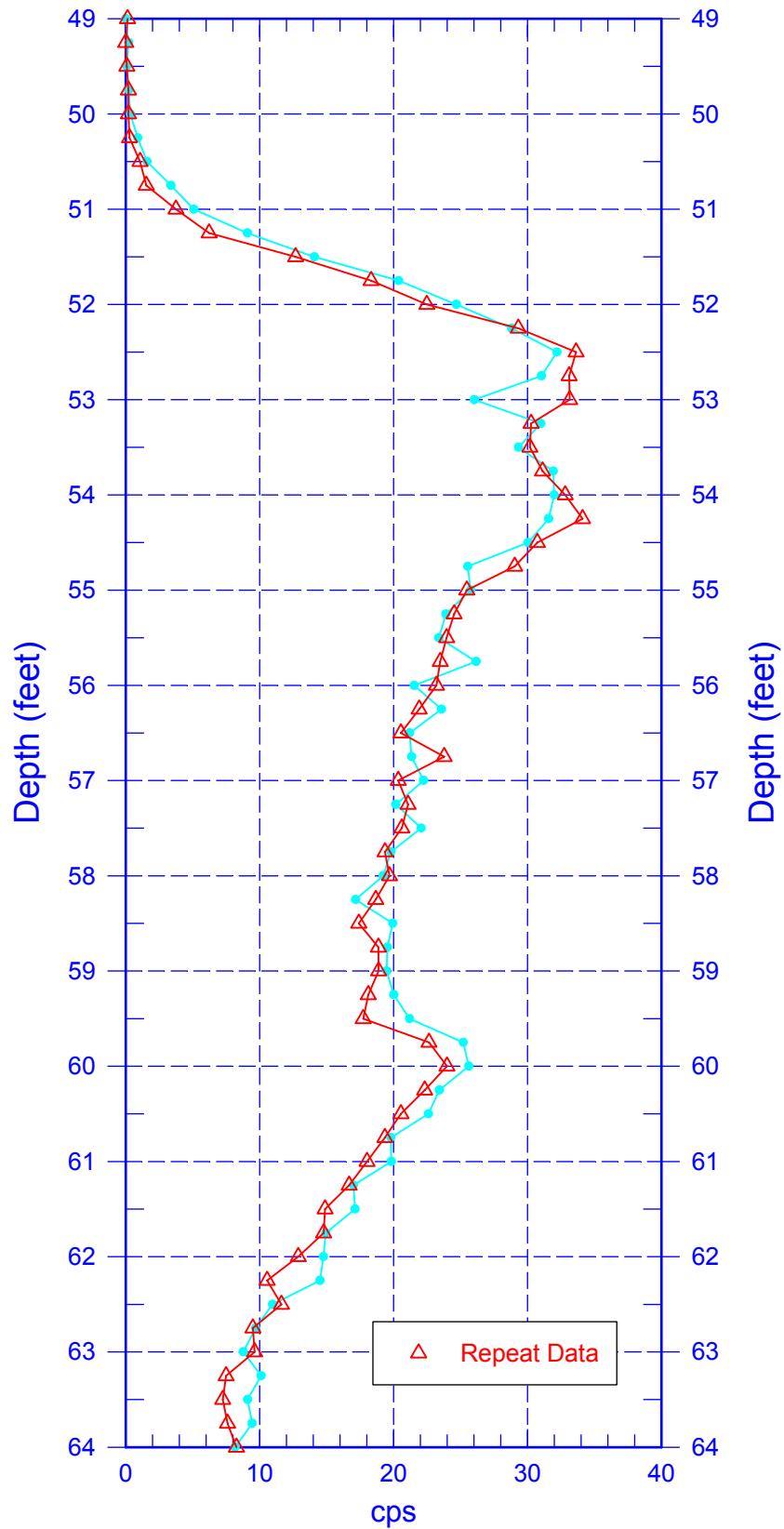
Depth scale: 1"=20 ft

Reference - Top of Casing

Last Log Date - 05/13/05

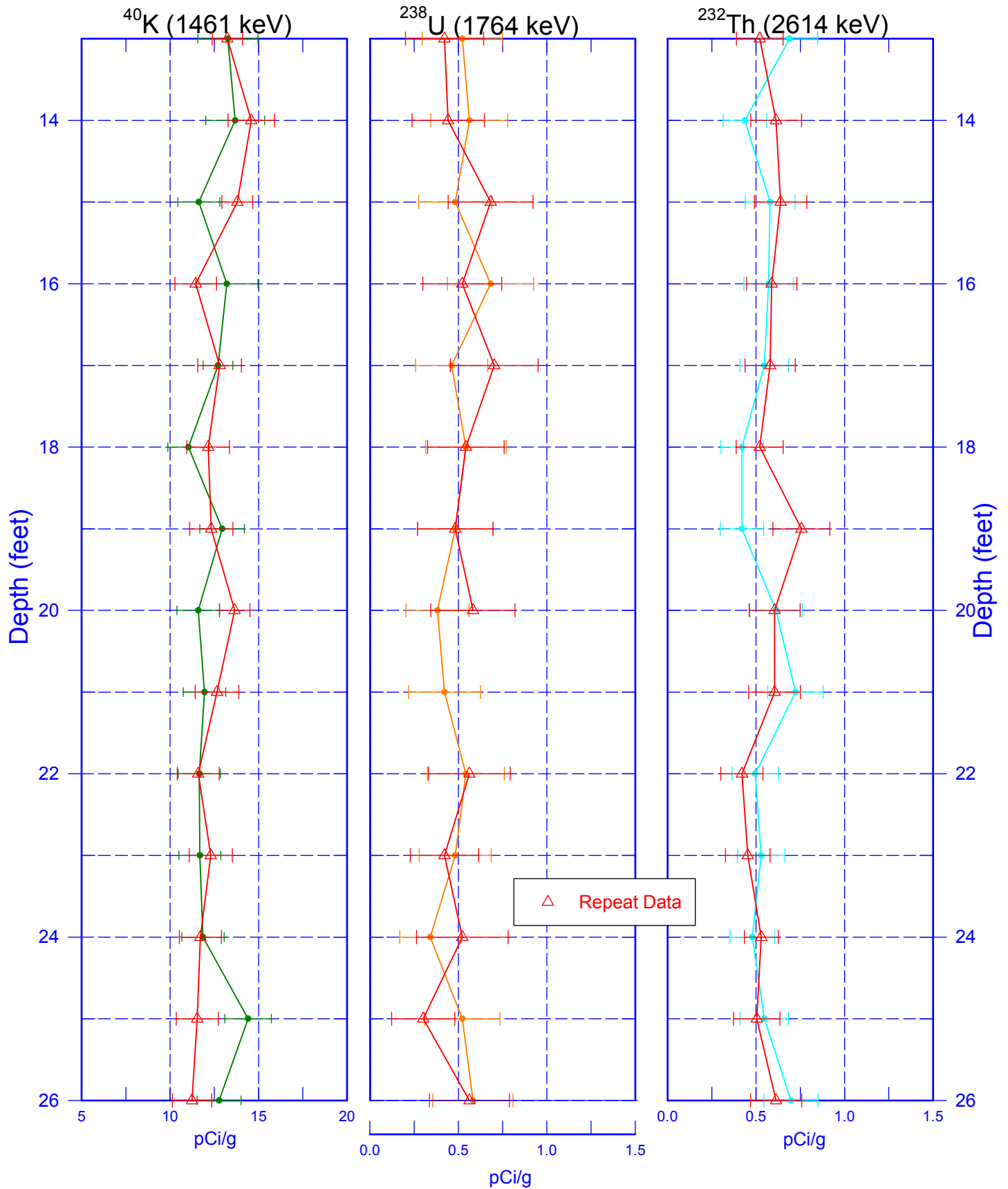
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Passive Neutron Repeat Section



299-W10-72 (A7162)

Repeat Section of Natural Gamma Logs

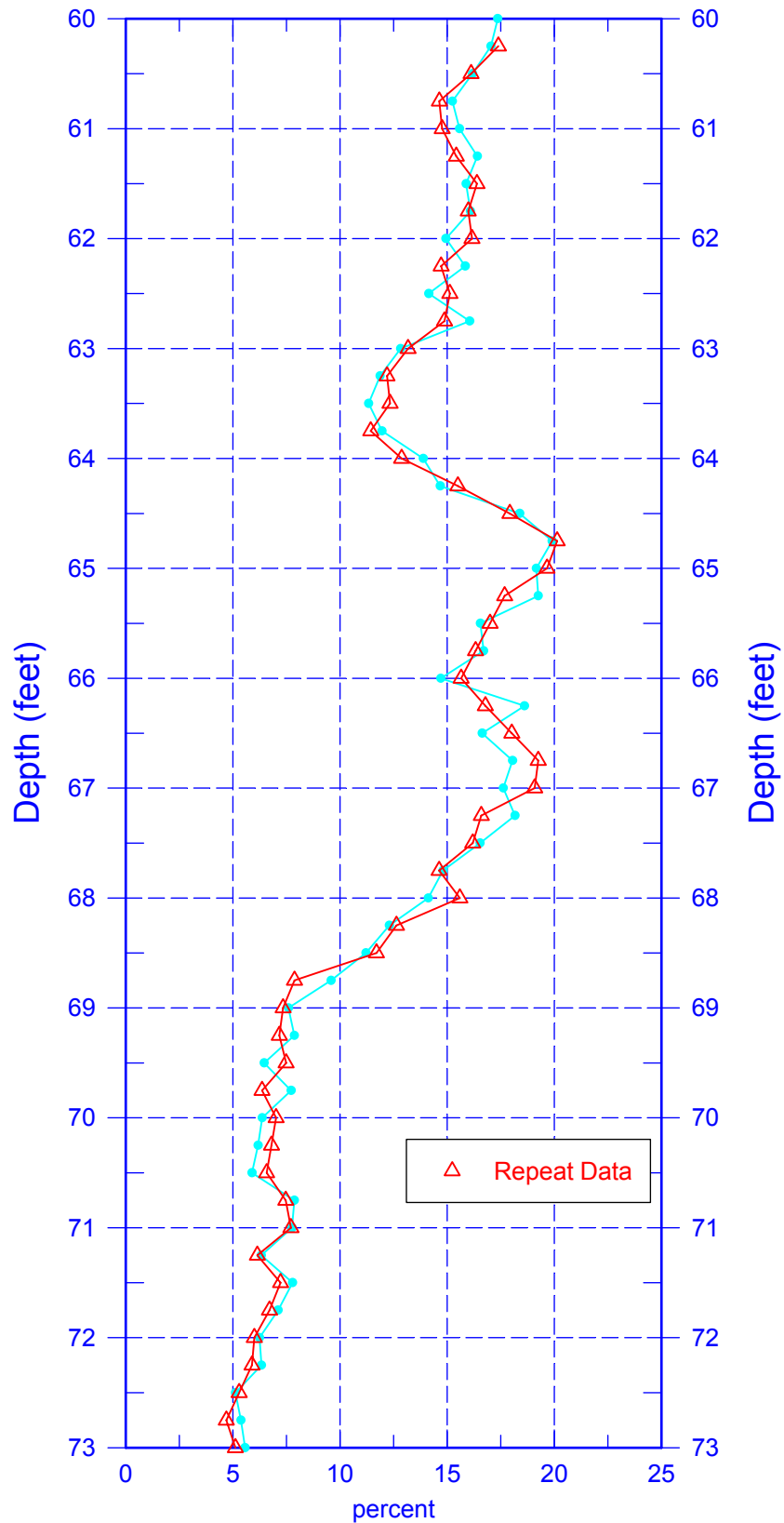


Zero Reference = Top of Casing

Last Log Date - 05/13/05

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Neutron Moisture Repeat Section



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¹³⁷Cs (662 keV) HRLS Repeat Section

